MATERIAL SAFETY DATA SHEET

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SRM Number: 3002
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SRM Name: Ethylbenzene in Methanol

Date of Issue: 13 July 2005

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SECTION I. MATERIAL IDENTIFICATION

Material Name: Ethylbenzene in Methanol

Description: SRM 3002 consists of two 5-milliliter ampoules containing approximately 2.5 mL of a solution of ethylbenzene in methanol.

Other Designations: **Ethylbenzene** (phenylethane; ethylbenzene; ethylbenzol; alpha-methyltoluene) in **Methanol** (methyl alcohol; wood alcohol; methyl hydroxide; carbinol; monohydroxymethane; wood spirit; wood naphtha; methylol)

Name	Chemical Formula	CAS Registry Number
Methanol	CH_3OH	67-56-1
Ethylbenzene	$CH_3CH_2C_6H_5$	100-41-4

DOT Classification: Methanol; UN1230; Packing Group II; Hazard Class 3.

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Components	Nominal Concentration (%)	Exposure Limits and Toxicity Data
Methanol	99	OSHA TWA: 260 mg/m^3 (200 ppm)
		NIOSH recommended TWA (skin): 260 mg/m^3 (200 ppm) (10 h)
		NIOSH recommended STEL (skin): 325 mg/m^3 (250 ppm)
		OES, UK TWA (skin): 266 mg/m^3 (200 ppm)
		OES, UK STEL (skin): 333 mg/m^3 (250 ppm)
		Human, Inhalation TC_{LO}: 86 000 mg/m^3
		Human, Oral LD_{LO}: 143 mg/kg
		Man, Oral TD_{LO}: 3 429 mg/kg
Ethylbenzene	1	OSHA TWA: 435 mg/m^3 (100 ppm)
		ACGIH TWA: 100 ppm
		NIOSH recommended TWA: 435 mg/m^3 (100 ppm) (10 h)
		NIOSH recommended STEL: 545 mg/m^3 (125 ppm)
		UK OES TWA (skin): 441 mg/m^3 (100 ppm)
		Human, Inhalation TC_{LO}: 21 700 mg/m^3
		Rat, Oral LD_{50}: 3 500 mg/kg

SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS

Methanol	Ethylbenzene
Appearance and Odor: a clear, colorless liquid with a characteristic alcoholic odor	**Appearance and Odor:** a clear, colorless liquid with a distinct odor
Relative Molecular Mass: 32.04	**Relative Molecular Mass:** 106.17
Density: 0.7914 g/m^3	**Density:** 0.8670 g/m^3
Boiling Point: 65 °C (149 °F)	**Boiling Point:** 136 °C (277 °F)
Freezing Point: –94 °C (–137 °F)	**Freezing Point:** –95 °C (–139 °F)
Vapor Pressure (@ 20 °C): 97.25 mmHg	**Vapor Pressure (@ 20 °C):** 7.1 mmHg
Evaporation Rate (butyl acetate = 1): 4.6	**Evaporation Rate (butyl acetate = 1):** < 1
Viscosity (@ 20 °C): 0.59 cP	**Viscosity (@ 25 °C):** 0.64 cP
Solubility in Water: soluble	**Solubility in Water (@ 20 °C):** 0.015 %
Solvent Solubility: Soluble in ether, benzene, alcohol, acetone, chloroform, ethanol, ketones, and most organic solvents	**Solvent Solubility:** Soluble in alcohol, ether, benzene, sulfur dioxide, carbon tetrachloride. Insoluble in ammonia

NOTE: The physical and chemical data provided are for the pure components. Physical and chemical data for this methanol/benzene solution do not exist. The actual behavior of the solution may differ from the individual components.

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Methanol

Flash Point: 11 °C **Method Used:** Closed Cup **Autoignition Temperature:** 385 °C

Flammability Limits in Air (Volume %): **UPPER:** 36
LOWER: 6.0

Ethylbenzene

Flash Point: 15 °C **Method Used:** Closed Cup **Autoignition Temperature:** 432 °C

Flammability Limits in Air (Volume %): **UPPER:** 6.7
LOWER: 0.8

Unusual Fire and Explosion Hazards: Methanol and ethyl benzene are severe fire hazards. Vapors are heavier than air and may travel a considerable distance to a source of ignition and flash back. Vapor and air mixtures are explosive.

Extinguishing Media: Use alcohol-resistant foam, dry chemical, carbon dioxide, or water spray.

Special Fire Procedures: Fire fighters should wear a self-contained breathing apparatus (SCBA) with a full face piece in the pressure demand or positive mode and other protective clothing.

SECTION V. REACTIVITY DATA

Stability: **X** **Stable** ___ **Unstable**

Stable at normal temperatures and pressure.

Conditions to Avoid: Avoid contact with heat, sparks, flames, or other sources of ignition. Avoid inhalation of vapors or combustion by-products. Keep out of water supplies and sewers.

Incompatibility (Materials to Avoid): This material is incompatible with halo carbons, combustible materials, metals, oxidizing materials, halogens, metal carbide, bases, and acids.

See Section IV**: "**Unusual Fire and Explosion Hazards".

Hazardous Decomposition or Byproducts: Thermal decomposition products may include toxic oxides of carbon.

Hazardous Polymerization: ___ **Will Occur** **X** **Will Not Occur**

SECTION VI. HEALTH HAZARD DATA

Route of Entry: **X** **Inhalation** **X** **Skin** **X** **Ingestion**

Methanol: Methanol is a skin and eye irritant and can cause nerve damage. This material is harmful if inhaled or absorbed through skin. Ingestion may be fatal or cause blindness. Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Exposure can cause damage to the eyes, liver, heart, and kidneys. Methanol may also cause gastrointestinal disturbances and convulsions.

Ethylbenzene: Ethylbenzene may be harmful by inhalation, ingestion, or skin absorption. Causes skin irritation. Vapor or mist is irritating to the eyes, mucous membranes, and upper respiratory tract. Can cause central nervous system depression. Exposure can cause nausea, headache, and vomiting.

Medical Conditions Generally Aggravated by Exposure: Ethylbenzene may cause kidney disorders, liver disorders, respiratory disorders, skin disorders, and allergies. **Methanol** may cause eye disorders, kidney disorders, skin disorders, and allergies.

Listed as a Carcinogen/Potential Carcinogen (Methanol):

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens		X
In the International Agency for Research on Cancer (IARC) Monographs		X
By the Occupational Safety and Health Administration (OSHA)		X

Listed as a Carcinogen/Potential Carcinogen (Ethylbenzene):

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens		X
In the International Agency for Research on Cancer (IARC) Monographs	X	
By the Occupational Safety and Health Administration (OSHA)		X

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Watch for chemical irritations and treat them accordingly. Obtain medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance.

Inhalation: If inhaled, move the victim to fresh air. If breathing is difficult, give oxygen; if the victim is not breathing, give artificial respiration. Obtain medical assistance if necessary.

Ingestion: If ingested, wash out mouth with water. Obtain medical assistance immediately.

TARGET ORGAN(S) OF ATTACK: **Ethylbenzene:** central nervous system
Methanol: central nervous system

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material Is Released or Spilled: Notify safety personnel of major spills and/or leaks. Evacuate nonessential personnel. Stop the leak if one can do so without risk. Absorb small spills with sand or other absorbent material and place into containers for disposal.

Waste Disposal: Follow all federal, state, and local laws governing disposal. Methanol is subject to disposal regulations U.S. EPA 40 CFR 262, Hazardous Waste Number U154. Keep Ethylbenzene out of sewers and water supplies. Ethylbenzene is subject to disposal regulations U.S. EPA 40 CFR 262, Hazardous Waste Number D001.

Handling and Storage: Persons handling this material must wear protective eyewear, clothing, and gloves to prevent contact with this material.

NOTE: Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

This material should be stored in a cool, dry, well-ventilated area away from incompatible materials and conditions. Protect containers from physical damage.

SECTION VIII. SOURCE DATA/OTHER COMMENTS

Sources: MDL Information Systems, Inc., MSDS *Ethylbenzene*, 17 June 2004.
MDL Information Systems, Inc., MSDS *Methanol*, 116 September 2004